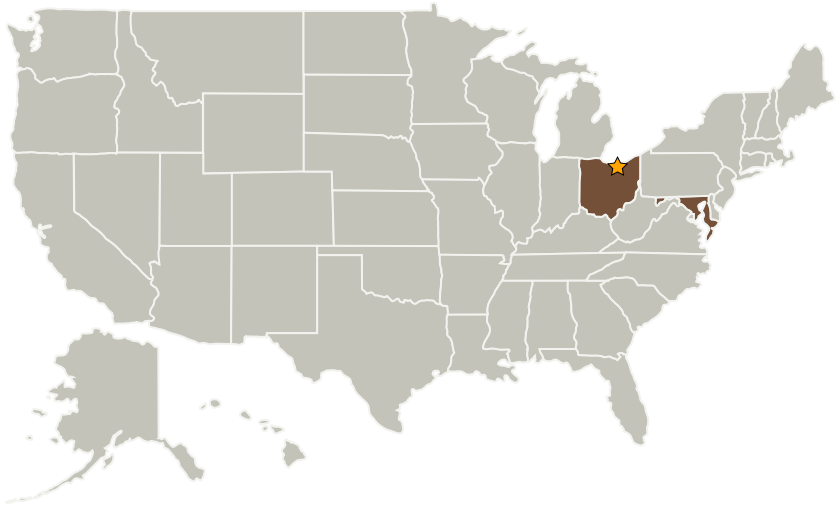
High Efficiency Solar Cell on Low Cost Metal Foil Substrate, Phase I

Completed Technology Project (2004 - 2004)

Project Introduction

Future space missions will require Solar cell arrays having specific power ratings in excess of 1000 W/kg. Conventional crystalline photovoltaic technology comprised of epitaxial photovoltaic semiconductor materials grown on single crystal semiconductor substrates, cannot provide these specific ratings. We propose to synthesize nano-precursors of solar cell materials of uniform size by Solvo-thermal process. These nano-precursors will be deposited as nano-thin film on low cot and flexible metal foil substrate by Electrophoretic technique. Through subsequent , insitu annealing, thin films with grain size >50 microns will be produced. GaAs, Ge and InP will be investigated to determine which material can be deposited as high quality large grain thin film without contamination. The synthesized nano-precursors, electrphoretically deposited nano-thin film and large grain thin film produced after annealing will be fully characterized. A combination of crystalline thin film photovoltaic layers having an efficiency of just 25% fabricated on low cost, light weight flexible substrate such as a metal foil, would yield a specific power rating of >1200 W/kg. During Phase II multi-junction solar cell will be grown on the large grain thin film produced during Phase I on flexible/low cost metal foil substrate.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Brimrose Corporation of America	Supporting Organization	Industry	Sparks, Maryland

Primary U.S. Work Locations	
Maryland	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Gomath V Jagannathan

Technology Areas

Primary:

- TX10 Autonomous Systems
  - TX10.3 Collaboration and Interaction
    - TX10.3.4 Operational Trust Building